

VII.—*Excerpta Botanica, or abridged Extracts translated from the Foreign Journals, illustrative of, or connected with, the Botany of Great Britain.* By W. A. LEIGHTON, Esq., B.A., F.B.S.E., &c.

No. 5. *On the Anther of Chara vulgaris and Chara hispida, and the Animalcules contained in it.* By M. GUSTAVUS THURET. (Ann. des Sc. Nat. vol. xiv. p. 65.)

IN the axillæ of the branches of *Chara*, immediately below the carpels, are globular sessile bodies, of a vivid red colour, which, entirely disappearing on the approaching maturity of the carpels, are conjectured to perform the functions of stamens, although in other respects they possess no analogy of organization with the male organs of Phanerogamæ. The outer covering of these consists of a membrane formed of transparent cellules, which produce the appearance of a white ring encircling the anther. Under this membrane are irregular oval cellules arranged into triangular valves, each valve being composed of from twelve to twenty cellules radiating from a common centre, and enclosing the red granules which produce the brilliant colour of the anther. On the full development of the anther these valves disunite, and permit the bodies enclosed in their interiors to expand in the water. Those anthers most remote from the central axis always open first, and those on the lower whorls before those on the upper ones. The interior of the anther is filled with flexuose, transparent, chambered (*cloisonnées*) filaments, of unequal length, emanating chiefly from a central cellular base, from which also radiate a few ovoid utricles, containing orange-coloured granules. Each of these utricles adheres to the cellular base by its narrowest extremity, and is fixed perpendicularly by its largest extremity to the centre of one of the triangular valves. The contained granules are oval, orange-coloured, and arranged in a linear series; whilst, on the contrary, in the cellules of the valves the granules are round, red, scattered without order, and distant from the walls of the cellules.

In these chambered filaments the animalcules are produced. These filaments, when examined in a very young state, appear only as oval utricles enclosing a granular matter, some of them being detached, but the greater number adherent to the cellular base before mentioned. A little later these utricles become chambered, a nucleus appearing in each chamber or division. The introduction of the water through the walls of the filaments seems to conduce towards the formation of the nucleus, at least such is my conjecture, from having frequently

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observed the rapid formation of the nucleus in filaments which previously possessed no traces of it. These nuclei have a slight green tinge, probably owing to an optical illusion, and become brown by iodine. They are always affixed (*adossés*) to the partitions (*cloisons*). Gradually they become effaced, and the animalcules begin to be distinguished; indeed, they are frequently observable at one extremity, whilst the nuclei remain at the other, even in the same anther and filament. On the complete formation of the animalcules, the partitions of the chambers are indistinguishable, from the confusion arising from the great number of the curves. At each curvature of the animalcule a swelling (black or brilliant, according to the increase or diminution of focal distance) is perceived, doubtless owing to the optical illusion produced by the greater thickness of the body at these points of flexion.

The animalcules are at first motionless, and remain for a greater or lesser time in the water before they begin to move and struggle to release themselves from their prison. In this they do not always succeed, although their twisted position attests the efforts made for disengagement. Those which do succeed escape laterally by a sudden motion, similar to the elasticity of a slackened spring. After this great effort they remain for some time motionless, or if the temperature and season be unfavourable, their motions are slow and soon cease. On the contrary, the animalcules observed at the end of June and beginning of July agitated themselves with extreme vivacity, and in such a manner as to leave no doubt of their animality. They rapidly traversed the field of the microscope in different directions, crossing and meeting each other, and deviating from their route, and after employing the greater portion of the day in observation, they were left in similar and unrelaxed motions.

The portion of their body most apparent appeared like a spirally-rolled thread of three to five curves (*un fil roulé en tirebouchon, formant de 3 a 5 tours de spire.*) They were slightly tinged with green similar to the nuclei, and like them turned brown with iodine; their two extremities becoming more or less coloured (according to the quantity of iodine employed) than the rest of the body, thus indicating a difference of nature in these portions. At a little distance behind one extremity proceed two bristles or tentacula of excessive tenuity, which the animalcule incessantly agitates with great rapidity. These are probably organs of locomotion similar to the filiform prolongation found in the Infusoria without ciliæ. Indeed, the part thus furnished with tentacula moves

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foremost, drawing after it the rest of the body, which turns about in the water, but always preserves its *turriculate* form. The incessant agitation of these tentacula and their extreme tenuity rendered it impossible to observe them in the living animal; recourse was therefore had to the evaporation of the water or to the application of a slight tincture of iodine, when the animalcules ceased their motions, became contracted, and their spiral unrolled, when the tentacula were rendered very distinct, from their brown colour. These tentacula were frequently observed to be soldered together from one-half to one-third of their length upwards, but others were also noticed to be entirely separated down to their bases. A swelling similar to that in the flexure of the body was perceived in their curves.

Ammonia arrested their motions and contracted the body gradually into a small oval mass, but did not produce the phenomenon of decomposition by solution (*diffluence*) so remarkable in the Infusoria. A very weak solution of chlorhydric acid in water violently contracted them into a shapeless mass.

In escaping from the filaments a portion only of the body of the animalcule was sometimes disengaged, and fruitless efforts were made by it to extricate the rest. In such cases it was noticed that the portion bearing the tentacula invariably remained within the tube of the filament. On the filaments becoming empty, their divisions reappeared very distinctly. No traces of the passage of the animalcule were observed, unless the brilliant points sometimes seen on each division of the filament be regarded as such.

The ovoid utricles accompanying the filaments are spheroidal in the young anthers, but subsequently take the form of an egg truncated at both ends, or nearly that of a parallelogram, having one of its ends narrower than the other. Their wall or paries is transparent, the orange granules contained in them being of an elongated form, and lying in longitudinal lines in the direction of the currents of circulation, their upper extremity alone being destitute of them.

In the interior of the utricles is frequently an oval globule, generally motionless, but sometimes circulating with greater or less rapidity along the walls. Besides this globule, which is apparently formed of a granular fluid, are seen the rapid currents ascending and descending longitudinally. These two circulations, which are doubtless different appearances of the same phenomenon, occur either together or separately in the same utricule. In some utricles the globule was motionless,

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whilst three round and thick orange-coloured granules ascended and descended together rapidly along the same line of circulation, and continued visible from one extremity to the other.

After long immersion of the utricles in water, the arrangement of the orange-coloured granules apparently proved the existence of a double sac in which the granules were contained. The circulation in this case was similar to that described by Mr. Slack in hairs of *Tradescantia* (Trans. Soc. Arts, vol. xlix. p. 41). "Each articulation appeared to consist of an exterior glassy tube. Between this and the colouring matter was the circulating fluid with its molecules. The coloured fluid of the hair appeared to be enclosed in a membranous sac, which formed an axis around which the fluid circulated."

On crushing the anther there were observed some purple hairs formed of an immense quantity of granules of extreme minuteness, endowed with a very quick molecular motion.

Iodine rendered the orange granules green. Alcohol did not dissolve them. The latter did not arrest the circulation of the nucleus in the ovoid utricles, although it instantaneously killed the animalcules.

VIII.—*Notes on Saxifraga umbrosa*: By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S., &c.; and by the Reviewer of Baines's 'Yorkshire Flora.'

IN the 39th Number of these Annals (vol. vi. p. 401), the Rev. W. T. Bree expresses his doubt if the *Saxifraga umbrosa* is "in fact a *genuine* native of Britain;" and if he had said Great Britain, I should have been inclined to say that it has all the appearance of having been introduced, and that much more evidence is requisite before we ought to admit it to have been a genuine native. Concerning Ireland, however, I must express quite the contrary opinion, being convinced that there is *no* plant that has a more decided claim to be considered as certainly indigenous. I have myself seen it in the greatest plenty upon the wild mountains of Connamara and Joice's county, but certainly did not notice it in the neighbourhood of Killarney, where *S. Geum* is peculiarly abundant.

It is worthy of notice, that the plant found in Connamara differs as a variety from the Pyrenæan plant, by having its leaves dentate, crenate, and not simply and bluntly crenate, as in the plant from the Pyrenees. The figure given in Eng. Bot. (t. 663), which was taken from a specimen gathered at Throp Arch woods, in Yorkshire, approaches much more

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